IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

MAIL STOP NON-FEE AMDT (PATENT)

Applicants:	Tavares, Bruce A. and Nelson, Bart J.	
Application's Title:	POWDER METAL MIXTURE INCLUDING MICRONIZED CELLULOSE FIBERS	
Serial No.	10/758,032	Filed: 14 January 2004(01/14/2004)
Group Art Unit:	1742	Examiner: NGOCLAN T. MAI
Docket No.:	4588-00003B	

DECLARATION UNDER 37 C.F.R. 1.132 OF BARBARA NYGAARD

I, Barbara Ann Nygaard, residing at 3892 98th Lane, in the City of Circle Pines, County of Anoka, and State of Minnesota, 55014, a citizen of the United States of America, do hereby solemnly declare:

1. I graduated from Centennial High School in Blaine, MN. in 1978 and soon thereafter, in August 1978, was employed as a production worker by Northern Technologies International Corporation, where I am currently still employed as Laboratory Manger. My duties involve inspection, testing and new product development.

2. I have studied and understand the disclosure of the above-identified patent application, and have read the article titled "The Effect of Microcrystalline Cellulose on the Mixing and Compaction Response of Ferrous Powders" by L. D. Jones et al in Powder Technology. In each powder metal application the physical properties of each powder are subjected to high heat and high pressure.

3. I recently was provided with a sample of Lattice NT microcrystalline cellulose and set out to compare its properties with those of a sample of micronized cotton which is currently marketed by React-NTI, without heating the powders because I expect that heating would alter their properties in a way I could not envision. Each sample is a white powder having primary particles in the same size range.

4. To this end, that is, making a comparison of the powders without subjecting them to high heat and pressure, I first had Mary Rubink, a laboratory technician, measure the bulk density of each powder, under my supervision.

She weighed each of two 100 ml glass cylinders and filled each with powder, each cylinder being tapped while it was being filled. Filling was stopped and the level of powder struck with a sharp straight edge so as to be level with the rim of each cylinder. Tapping was continued, more powder being added as necessary, until the struck level remained stable and did not fall.

The weight of each cylinder was then measured and the bulk density of the powder was computed.

The following results were obtained:

Powder	Bulk Density
Lattice NT microcrystalline cellulose	0.856 g/cm^3
Micronized cotton	0.681 g/cm^3

It is evident that the bulk density of the microcrystalline is about 25.7% greater than that of the micronized cotton.

5. In a separate test, a few days ago, we compared the effect of each powder in deionized water and in canola oil.

To do so, 4 g of each powder was dispersed in 100 ml of deionized water and 100 ml of canola oil, each liquid held in a jar, and each jar sealed with a screw top. The jars were then shaken on an Eberbach 115 V shaker on "High" for 10 min and removed. The jars were allowed to rest for 16 hr at room temperature.

In the appended Exhibit A and B, I have recorded my observations.

6. It is evident that the microcrystalline cellulose powder, though in the same size range as the micronized cotton, behaves differently in both water and in oil. The difference in behavior cannot be accounted for by their difference in bulk densities.

The wetting properties and dispersal characteristics of each powder are different. I attribute these different properties to the structure of the individual primary particles and also to the surface properties of each powder.

The undersigned declarant declares further that all statements made herein of his own knowledge are true, and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: April 7, 2006

Barbara Ann Nygaard

Comparison Of Microcrystalline Cellulose With Micronized Cotton In Deionized Water

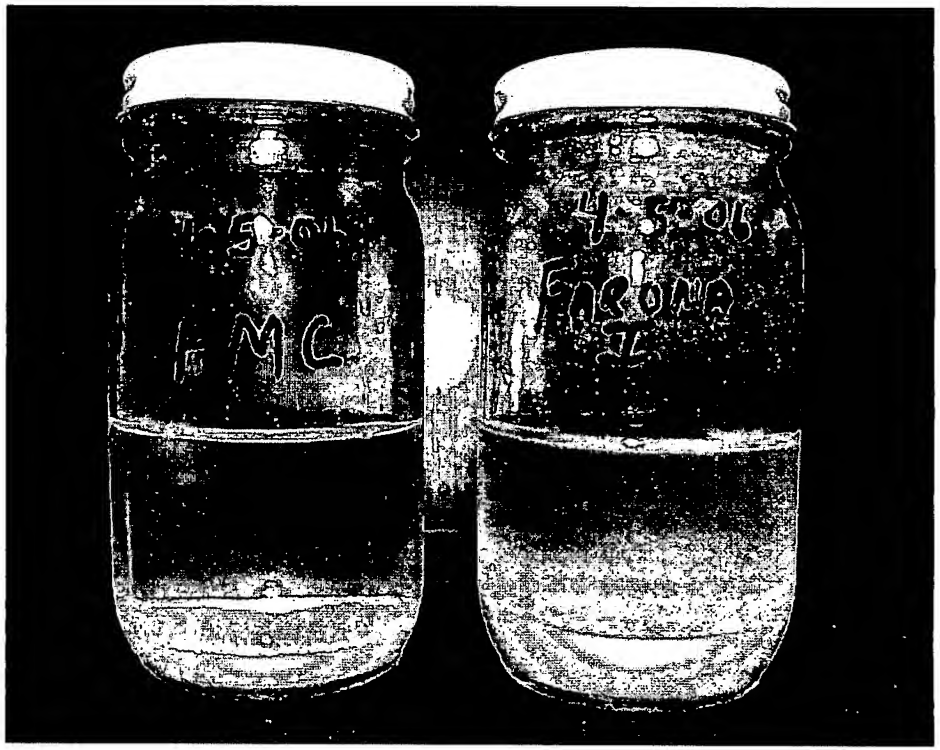
1) Lattice NT Microcrystalline Cellulose From FMC Lot No:5416C (bulk density 0.8561g/cm^3)
2) React Farona I Cotton Powder Lot No:3400 (bulk density 0.681g/cm^3)

- **Testing Criteria & Results**

EXHIBIT A

- **Procedure**:
- #1 4g Lattice NT, 100 mil deionized water
- #2 4g Farona 1, 100 mil deionized water
- Each sample was blended and placed on a shaker to mix for ten minutes.
- Samples were removed from shaker after ten minutes and allowed to rest for sixteen hours, at ambient conditions 75°F ± 2°F.
- **16 hour observation**
- #1 Lattice NT separation occurred leaving a layer of white residue on the bottom of container. The layer measuring about 1/8" thick. The water above the transition zone is transparent and clear. And the line at the transition zone is quit distinct.
- #2 Farona 1 – Separation occurred leaving a layer of white residue on the bottom of the container. The layer measuring about ½" thick. Water above transition zone is yellow and transparent, but is somewhat cloudy relative to #1

Sample #1 **Sample #2**



- **pH of each solution:**
- Equipment Corning pH meter 36si
- Temperature 23.8°C
- #1 5.9 pH Lattice NTI Sample
- #2 2.9 pH Farona I Sample

Comparison Of Microcrystalline Cellulose With Micronized Cotton In Canola Oil

1) Lattice NT Microcrystalline Cellulose From FMC Lot No.5416C (bulk density 0.8561g/cm^3)
2) React Farona I Cotton Powder Lot No:3400 (bulk density 0.681g/cm^3)

EXHIBIT B

- **Testing Criteria & Results**

- **Procedure**:
- #1 4g Lattice NT 100 mil canola oil
- #2 4g Farona 1 100 mil canola oil
- Each sample was blended and placed on a shaker to mix for ten minutes.
- Samples were removed from shaker after ten minutes and allowed to rest for sixteen hours, at ambient conditions 75°F ± 2°F.
- **16 hour observation**
- #1 Lattice NT separation has occurred leaving a layer of white residue on the bottom of container. The residue measures about 1/4" thick. The upper layer above the transition zone is cloudy but gets progressively clearer towards the top. The separation layer is not clearly defined and merges with the transition zone..
- #2 Farona 1 – Separation has occurred leaving a cloudy thick off-white layer on the bottom of container. The residues measures about 1" thick. The transition zone is very cloudy but gets progressively clearer towards the top. The separated layer is less clearly defined than in sample #1 (Lattice NT).

- The #1 lattice NT sample is wetted and separates in a manner different from the manner in which the sample #2 Farona 1 does.

- **Viscosity:**
- Brookfield Viscometer Speed 30rpm, spindle LV 2 ambient condition 75°F ± 2°F.
- Samples were stirred with a non aerating stirrer for 1 minute. Samples were removed and the viscosity of each was measured immediately following the stirring.
- #1 60 cps Lattice NT Sample
- #2 120 cps Farona I Sample

Sample #1 **Sample #2**